

# Bismuth strontium calcium copper oxide

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**Bismuth strontium calcium copper oxide**, or **BSCCO** (pronounced "bisko"), is a family of high-temperature superconductors having the generalized chemical formula  $\text{Bi}_x\text{Sr}_2\text{Ca}_n\text{Cu}_{n+1}\text{O}_{2n+6}$ .

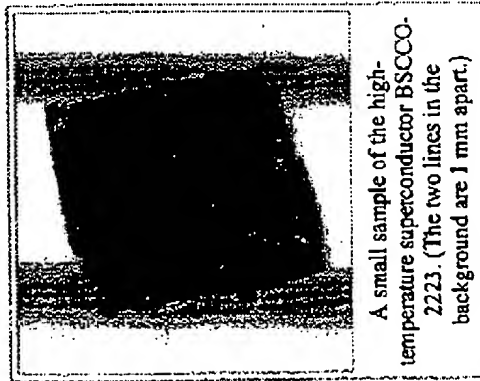
Specific types of BSCCO are usually referred to using the sequence of the numbers of the metallic ions. Thus BSCCO-2212 ( $\text{Bi}_2\text{Sr}_2\text{Ca}_1\text{Cu}_2\text{O}_8$ ) has a critical temperature of 95 K and BSCCO-2223 ( $\text{Bi}_2\text{Sr}_2\text{Ca}_2\text{Cu}_3\text{O}_{10}$ ) has  $T_c = 107$  K. Both these critical temperatures are above the temperature of liquid nitrogen. BSCCO was also the first high-temperature superconductor to be discovered which did not contain a rare earth element.

BSCCO-2212 is the first high-temperature superconductor to be used for making conducting wires. Although it has the same problems with weak links at crystal grain boundaries as YBCO, for BSCCO this can be overcome by a texture evolution during the rolling process due to Van-der-Waals coupled  $\text{BiO}$  layers, which are not present in YBCO. However, its critical current density in magnetic fields at elevated temperatures is about a factor 10 less than that of YBCO.

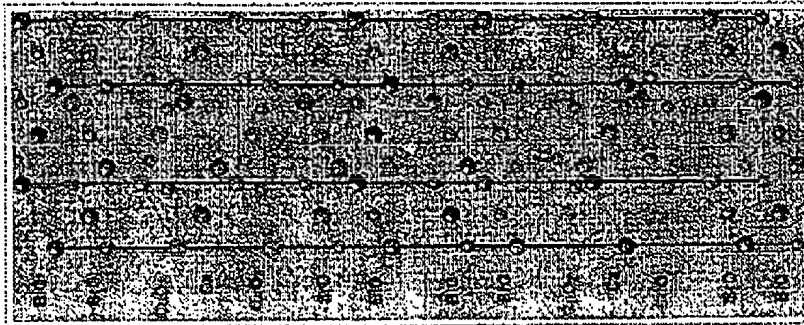
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| High-temperature superconductors



A small sample of the high-temperature superconductor BSCCO-2223. (The two lines in the background are 1 mm apart.)



The unit cell of BSCCO-2212.

The other BSCCO family members have very similar structures: 2201 has one less  $\text{CuO}_2$  in its top and bottom half and no Ca layer, while 2223 has an extra  $\text{CuO}_2$  and Ca layer in each half.

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